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10/522,051	01/20/2005	Keijo Imelainen	7633-0001WOUS	3980
35301 7590 10/26/2007 MCCORMICK, PAULDING & HUBER LLP CITY PLACE II 185 ASYLUM STREET HARTFORD, CT 06103			EXAMINER CORDRAY, DENNIS R	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/522,051

Applicant(s)

IMELAINEN, KEIJO

Examiner

Dennis Cordray

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Arguments*

Applicant's amendments filed 8/23/2007 have overcome the objections to the disclosure and the rejections under 35 U.S.C. 112, 2<sup>nd</sup> paragraph. Accordingly, the previous objections and rejections under 35 U.S.C. 112 have been withdrawn.

Applicant's amendments and arguments filed 8/23/2007 are insufficient to overcome the rejections over prior art. The rejections are maintained and have been amended to incorporate the amended and newly added claims. In addition, due to the amendments, new grounds of rejection under 35 U.S.C 112 are presented.

Applicant's amendments and arguments center around feeding and burning fuel gas substantially continuously during the burning of the concentrated liquor in the soda recovery boiler.

The use of auxiliary fuels is known in recovery boilers, both during startup and during continuous operation. As Applicant admits, Kuusio teaches that gasified waste liquor can be used as a starting fuel in the waste liquor recovery boiler. Shaw et al (3607117) teaches that, under normal conditions, auxiliary fuel (gas is mentioned) is supplied when the boiler is started up to initiate combustion of the black liquor, then subsequently shut off leaving the black liquor as the only fuel supplied to the boiler (col 3, lines 42-50). Shaw et al additionally teaches that auxiliary gas can be supplied during operation of the recovery boiler to increase the production of steam to meet steam demands exceeding the amount produced by combustion of black liquor alone (col 3, lines 54-60). Tomlinson II (4312702) teaches that auxiliary fuel, such as oil or

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gas, is used to maintain operating temperatures throughout the furnace in recovery boilers over a considerable range of production rates (col 6, lines 10-16). One of ordinary skill in the art would have been able to determine the need for auxiliary fuel and to supply the fuel continuously to meet steam generation demands and to maintain temperature control in the furnace.

Applicant argues that Rundstrom does not teach the use of a wood gasifier in connection with pulp mills. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Rundstrom teaches a wood gasifier for reducing non-homogeneous particles of wood to a relatively tar-free fuel gas without release of large quantities of air pollutants (col 2, lines 36-48). Since Saviharju et al teaches use of a gasifier, the gasifier of Rundstrom was known in prior art and the combination would have produced no change in the method of Saviharju et al or in the function of the gasifier, the combination would have yielded predictable results to one of ordinary skill in the art. Motivation to combine would have been to employ a low-tar fuel source producing minimal air pollution.

#### ***Examiner's Suggestion***

It is noted that the Examiner's suggestion was not acted upon. To repeat, it is suggested to change the word "bark" in lines 7, 8 and 11 of Claim 19 to "dried bark" or "bark that has been dried" for clarity. The word "bark" in line 5 of Claim 19 should be changed to "wood bark," also for clarity.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1, 9 and 19 recite that the fuel gas is supplied and burned substantially continuously during operation of the soda recovery boiler. The Specification does not disclose that the fuel gas is supplied or burned substantially continuously, thus fails to provide support for the amendments. If the Applicant believes the Specification does support the claim amendments, the Examiner requests that the specific source(s) of such support, page and line numbers or paragraphs, be provided in the reply to this Office Action as well as an explanation of how the cited lines or paragraphs provide support for the amendments.

Claims 2-8, 10-18 and 20-31 depend from and inherit the limitations of Claims 1, 9 or 19.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 19 is directed to an apparatus comprising a fuel gas outlet means connected to the feed unit of the recovery boiler. It is not clear how the newly added limitation of feeding the fuel gas produced from the bark by gasification "substantially continuously during operation of the boiler" further defines or limits the apparatus.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 9-11, 13-14 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saviharju et al (2004/0011484) in view of Kuusio et al (WO 93/11297) and Rundstrom (5226927) as evidenced by Shaw et al (3607117) and Tomlinson II (4312702).

Claims 1, 3, 5, 9-11 and 13: Saviharju et al teach that, in chemical pulp mills, wood bark is removed from logs, and the wood log is cut into chips and chemically processed (cooked or digested) to separate the fibers. The cooking chemicals are recovered from the waste alkaline cooking liquor, or black liquor, by firing the black liquor in a recovery boiler. Energy released in the recovery boiler is recovered as pressurized or superheated steam and used to produce electric power and low-pressure

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steam for other mill heating needs (p 1, pars 2 and 4). Saviharju et al discloses a modified process for producing energy at a pulp mill comprising (Abs; p 1, par 9):

- burning black liquor (cellulose pulp digestion liquor) from kraft pulping (i.e.-a sulfate pulp mill) in a recovery boiler and
- recovering heat from the flue gases produced in the form of saturated and partially superheated steam,

A combustible gas fuel is produced by gasifying bark, wood, wood chips, hogged wood, wood-based forest residues, then purified by removing the alkali components (ash) (p 1, par 10; pp 2-3, par 23).

Saviharju et al disclose that the wood material to be gasified is dried by flue gases from the recovery boiler (p 2, par 20).

Saviharju et al does not specifically recite digesting the wood material in a cooking liquor to separate the fibers, extracting the digested material as black liquor, or recovering the cooking chemicals from a soda recovery boiler, but the processes are taught as typical processes in a chemical pulp mill (p 1, par 2) and would have been obvious to one of ordinary skill in the art.

Saviharju et al does not disclose that the black liquor is concentrated by evaporation prior to being burned, that the bark or wood waste is dried to a moisture content below 30% prior to gasification, or that the combustible gas is burned in the recovery boiler.

Kuusio et al disclose a method of recovering energy from waste liquors from pulp processes by burning the waste liquor in a soda recovery boiler, recovering chemicals

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and recovering energy in the form of superheated steam (Abs; p 1, lines 6-12; p 5, lines 19-26; p 8, lines 32-35). Energy is also recovered as electrical energy (p 13, lines 33-35). The waste liquor is concentrated by evaporation to a dry solids content of about 80% (moisture content about 20%) before being sprayed into the recovery boiler (p 12, lines 29-34). A portion of the waste liquor is gasified to produce gas replacing fossil fuels to supply a separate superheating boiler for superheating the steam produced in the recovery boiler (p 6, lines 1-22). The waste liquor is concentrated prior to gasification to a dry solids content of up to 85% (15% moisture) to create a relatively good fuel and improving the economy of the gasifier and the soda recovery boiler (p 7, lines 15-31). The produced gas, after purification, can also be used as starting fuel in the recovery boiler to replace purchased fuel (p 10, line 37 to p 11, line 1) and as fuel in a lime mud reburning kiln (p 13, lines 19-24).

Rundstrom discloses a wood gasifier for continuously converting wood waste material into relatively tar free fuel gas without release of large quantities of air pollutants (Abs; col 2, lines 36-48). Drying the waste material to less than 20% moisture content is preferable for continuous operation (col 8, lines 43-49). Grinding the wood pieces to sizes between about 1/2" to 8" is also preferable for continuous operation (col 8, lines 25-30).

Saviharju et al, Kuusio et al and Rundstrom do not disclose continuously supplying or burning the fuel gas in the recovery boiler.

The use of auxiliary fuels is known in recovery boilers, both during startup and during continuous operation. Kuusio et al teach that gasified waste liquor can be used



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as a starting fuel in the waste liquor recovery boiler. Shaw et al (3607117) teaches that, under normal conditions, auxiliary fuel (gas is mentioned) is supplied when the boiler is started up to initiate combustion of the black liquor, then subsequently shut off leaving the black liquor as the only fuel supplied to the boiler (col 3, lines 42-50). Shaw et al also teaches that auxiliary gas can be supplied during operation of the recovery boiler to increase the production of steam to meet steam demands exceeding the amount produced by combustion of black liquor alone (col 3, lines 54-60) ), thus the gas is supplied and burned continuously during boiler operation. Tomlinson II (4312702) teaches that auxiliary fuel, such as oil or gas, is used to maintain operating temperatures throughout the furnace in recovery boilers over a considerable range of production rates (col 6, lines 10-16), thus the gas can be supplied and burned continuously during boiler operation.

The art of Saviharju et al, Kuusio et al, Rundstrom and the instant invention is analogous as pertaining to treatment of waste liquor and waste wood material in a pulp mill. It would have been obvious to one of ordinary skill in the art to use a portion of the gas generated by gasification of wood bark to fuel the recovery boiler in the process of Saviharju et al in view of Kuusio et al and Rundstrom to save on the cost of purchased fuel and minimize waste disposal. One of ordinary skill in the art would have been able to determine the need for auxiliary fuel in the recovery boiler and to supply and burn the fuel substantially continuously to meet steam generation demands and to maintain temperature control in the furnace. It would further have been obvious to concentrate

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the black liquor and the wood bark to the claimed moisture content to provide a better fuel for the recovery boiler and gasification processes.

Claim 2: of Saviharju et al, Kuusio et al and Rundstrom do not disclose the amount of generated gas used in the recovery boiler. However, the amount of fuel gas used in a combustion process is a result effective variable and it would have been within the capability of one of ordinary skill in the art to optimize the percentages of the generated gas required for operation of the recovery boiler, superheater and lime kiln.

Claims 4 and 17: Saviharju et al disclose that a portion of the generated gas is used in a superheating boiler that is separate from the recovery boiler (a two-part combustion chamber) (p 1, par 9; p 3, par 18; Fig. 1, items 14 and 18). The superheating boiler superheats the steam.

Claims 14 and 16: Saviharju et al disclose that the wood material can be dried by flue gases from the recovery boiler (p 2, par 20). While not explicitly disclosed, bringing the flue gas into direct contact with the waste wood would have been obvious to one of ordinary skill in the art. The flue gases are one source of surplus heat present at the pulp mill.

Claim 18: Saviharju et al disclose that a portion of the combustible gas is used to fuel a lime kiln to replace fossil fuels (p 2, pars 12 and 21).

Claims 6-8, 14-15 and 19-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saviharju et al in view of Kuusio et al and Rundstrom as applied to claims 1-5, 9-11, 13 and 17 above, and further in view of O'Hagan et al (4627173).

Saviharju et al disclose that dried wood fuel, such as bark, is supplied as a feed (feed means) to the gasifier (Fig 1, items 12 and 10; p 2, pars 18-21). Saviharju et al also disclose a purifier attached to the gas outlet of the gasifier and a gas outlet from the purifier connected to a superheating boiler and to a lime kiln (Fig 1, items 44 and 46).

Saviharju et al, Kuusio et al and Rundstrom do not disclose the configuration of the dryer, its connection to the gasifier, the temperatures of the gases used in the dryer or the use of steam. Saviharju et al, Kuusio et al and Rundstrom also do not disclose a connection from the gasifier to the recovery boiler.

Kuusio et al does disclose an example of a soda recovery boiler and two soda recovery boiler-superheating boiler combinations in a pulp mill. The bled steam pressure is 12 bars and that of the low pressure steam is 4.5 bars, which the Examiner construes as being typical steam pressures for bled steam and back pressure steam available in a pulp mill (p 14, line 34 to p 15, line 5).

O'Hagan et al disclose a fluidized bed dryer for particulate wet wood material or waste (i.e.-bark, wood chips, forest residues) using flue gases typically having a temperature of 400-600°F (204-315°C), and that the flue gases are cooled in the dryer to 160-250°F (71-121°C), which lies within the claimed ranges (Abs, col 1, lines 13-17; col. 6, lines 34-50; col 7, lines 36-38). Overheating of the wood is to be avoided (col 6, lines 17-18). O'Hagan et al also disclose that typically hog fuel or wet wood waste is dried to a 10-30% moisture content (col 5, lines 57-61). O'Hagan et al disclose that either steam or flue gas from a combustion source can be used for fluidizing and drying

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(Abs; col 1, lines 55-59; col 5, line 57 to col 6, line 1; col 7, lines 36-38). Using the drying gas to fluidize the bed inherently involves direct contact of the gas with the solids.

The art of Saviharju et al, Kuusio et al, Rundstrom, O'Hagan et al and the instant invention is analogous as pertaining to drying and gasifying waste wood. O'Hagan et al teaches that fluid or fluidized bed dryers are well known for the high rate of heat transfer between the gas and the fluidized particles as well as between bed particulates and surfaces immersed in the bed (col. 3, lines 18-21). It would have been obvious to a person of ordinary skill in the art to use a fluidized bed dryer as the drying apparatus in the process of Saviharju et al in view of Kuusio et al and further in view of O'Hagan et al to obtain a high rate of heat transfer and rapid drying of the bark. It would have further been obvious to one of ordinary skill in the art to use the claimed gas temperatures to avoid overheating the wood. Saviharju et al discloses recovery of energy in the form of low pressure steam, which is available for other plant needs and Kuusio et al discloses low pressure steam and bled steam having pressures in the claimed range. It would have been obvious to one of ordinary skill in the art to use available low pressure or bled steam having the claimed pressure as a readily available source of energy for drying. It would also have been obvious to dry the wood waste to 10-30% as disclosed by O'Hagan to provide a suitable fuel for the gasification process.

Providing a feed means for the bark to be dried and an outlet means for the dried bark connected to the feed means of the gasifier would have been obvious for proper operation of the process of Saviharju et al. As discussed previously, it would have been obvious to use a portion of the generated gas to fuel the recovery boiler, thus supplying

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a gas outlet means connected to the feed unit of the recovery boiler would also have been obvious.

Regarding Claims 20 and 23-25, although the cited references do not expressly disclose two separate dryers, duplication of parts has no patentable significance unless a new and unexpected result is produced (see MPEP 2144.04 VI B). There is no evidence in the instant Specification of unexpected results obtained by using two dryers in the process. It would have been obvious to make each dryer of the same type (i.e.-fluidized bed dryer).

Alternatively, the dryer of O'Hagan et al is constructed to provide a plurality of sequential drying zones. The dried fines are removed from each zone before the partially dried coarser particles are transported to the next zone, thus providing a more consistent moisture content in both fine and coarse particles. The gas flow velocity in each zone is varied to provide the optimum amount of drying (col 4, line 50 to col 5, line 9; col 5, lines 26-56). It would have been obvious to one of ordinary skill in the art to provide the drying in separate dryers in the process of Saviharju et al in view of Kuusio et al and Rundstrom and further in view of O'Hagan et al as a functionally equivalent option. The number of dryers required would have been determinable by one of ordinary skill in the art. It would have been obvious to make each dryer of the same type (i.e.-fluidized bed dryer). Connecting the outlet of one dryer to the feed unit of the next would also have been obvious.

Regarding Claims 21-22, Rundstrom discloses grinding the wood pieces to sizes between about  $\frac{1}{2}$ " to 8" is preferable for continuous operation of the gasifier (col 8, lines

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25-30). It would thus have been obvious to include a grinding step before or between two dryers to obtain wood pieces of sizes between about ½" to 8" for continuous operation of the gasifier.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saviharju et al in view of Kuusio et al and Rundstrom as applied to claims 1-5, 9-11, 13 and 17 above and further in view of Berg (5103743).

Saviharju et al, Kuusio et al and Rundstrom do not disclose gasification of peat.

Berg teaches that bark, wood waste and peat are cheaper solid fuels used in heating of lime kilns (col 1, lines 49-51).

Saviharju et al, Kuusio et al, Rundstrom, Berg and the instant invention is analogous as pertaining to the use of waste wood for energy sources in pulp mills. It would have been obvious to one of ordinary skill in the art to use peat in the gasification process of Saviharju et al in view of Kuusio et al and Rundstrom and further in view of Berg as a well known and functionally equivalent option for inexpensive fuels.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Cordray whose telephone number is 571-272-8244. The examiner can normally be reached on M-F, 7:30-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*DRC*  
DRC

  
STEVEN P. GRIFFIN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700